

sativus, and a number of others which might have been eliminated as certainly introduced, and placed in a separate list. As it is, without considerable labour, one can only distinguish two elements, namely, the endemic and the non-endemic, the latter comprising both indigenous and certainly introduced species. It is further complicated by the fact that "undetermined species," "varieties," and "forms" are all tabulated equally, and the percentages of the constituents of the flora are calculated from mixed totals.

For instance, the percentage of endemic species of flowering plants is obtained from a total which includes fifty "undetermined species," some of which, one would suppose, are also endemic. On the other hand, fifteen "varieties" and nineteen "forms" are included in the calculation, by which the endemic element is made out to be 44.4 per cent. This Dr. Robinson designates an "extraordinary endemic element"; but, as compared with some other islands and continental areas, it is low. In the Hawaiian Islands it has been placed at 81.4, in Juan Fernandez at 68.6, in St. Helena at 61.3, in West Australia at 85, and in Central America, including Mexico, at 70 per cent. This is the specific endemic element. According to the now generally accepted generic limits, there is almost no generic peculiarity in the flora of the Galapagos. *Scalesia* (Compositæ), which is as well defined as many other genera of this order, is confined to the archipelago, where it is represented by seventeen described species, most of them inhabiting only one island. This peculiarity, specially characteristic of the Galapagos flora, is shared by several other leading genera, amongst them *Castela*, *Euphorbia*, *Croton*, *Acalypha*, *Opuntia* and *Borreria*. On the other hand, there are some species peculiar to the archipelago but represented in nearly all the islands. *Telanthera echinocephala* (Amarantaceæ), *Oxalis Cornellii*, *Maytenus obovata* (Celastraceæ), and *Cordia lutea* (Boraginaceæ) are conspicuous examples.

But I must not attempt to summarise the whole of Dr. Robinson's work. Briefly, he enumerates 500 named species of vascular plants, of which fifty-two are ferns, only three of which are confined to the islands. The 205 endemic species of vascular plants include members of thirty-nine natural orders. The orders most numerously represented by endemic species are Compositæ, 39; Amarantaceæ, 29; Euphorbiaceæ, 25, besides 7 endemic varieties and 7 endemic forms; Rubiaceæ, 16; Gramineæ, 13; and Boraginaceæ, 14, giving a total of 136, or two-thirds of the whole, contributed by six orders. Against this there are seventeen other orders, limited to one endemic species each. But the Cactaceæ, the species of which are still badly defined, are much more prominent and generally dispersed than some of those much more numerous in species. Members of the Cactaceæ are recorded from all of the islands except Gardner, but including the small and remote Tower, Wenman, and Culpepper Islands. The Leguminosæ, counting only six endemic species, are also very prominent in the arboreal element, from the presence of the genera *Acacia*, *Cassia*, *Mimosa* and *Parkinsonia*. *Astragalus Edmonstonei* is a noteworthy outlier of this genus, not found by any recent collector. The presence of four species of the Lorantheæ is another interesting fact.

The affinities of the flora of the Galapagos Islands are wholly American, for the very few exceptional species may be accidental introductions. In composition it differs from that of the smaller flora of Juan Fernandez in having almost no generic endemic element, and in the specific endemic element being furnished by relatively numerous natural orders. From the flora of the Hawaiian Islands it also differs in being much less highly specialised. There are no tree-ferns,

no gymnosperms, and, with the exception of grasses and sedges, of which there are 52 and 25 species respectively, monocotyledons are very poorly represented. There is one orchid, *Epidendrum spicatum*, one bromeliad, *Tillandsia insularis*, and *Commelina nudiflora*, a very widely dispersed weed in warm regions, and *Hypoxis decumbens* complete the petaloid series. The aquatic genera *Potamogeton*, *Ruppia*, *Naias*, and *Lemna* rest on single records of American collectors.

Dr. Robinson concludes his essay with an examination of the "botanical evidence regarding the origin of the Galapagos Islands." After a brief examination of the evidence in favour of the opposed theories of submergence and emergence, he says:—"During a re-examination of the whole vascular flora of the islands, I have sought further light upon this question, and now find the peculiar distribution of the plants less difficult to account for on the emergence theory than it seemed when the Baur plants were studied some years ago." I should like to discuss this "new light" briefly in a separate communication, and will merely remark here that all the proved means of dispersal of the seeds of plants to long distances are insufficient, to my mind, to account for certain insular floras generally regarded as derived rather than as residues.

W. BOTTING HEMSLEY.

A NEW NATURAL HISTORY.¹

THE increased interest in zoology certainly existing at the present time is one of the causes which has induced Prof. Davis to attempt a natural history written on lines totally different from those usually followed in works of this kind. In place of treating the various animal groups in more or less full detail according to their presumed relationship to one another, it is proposed to consider them in relation to their environment, and to lay special stress on the interdependence of animals and plants, and the bearing upon life of chemical and physical conditions. Such a mode of treatment undoubtedly has great possibilities before it, and is one which should do good by drawing attention to our lack of knowledge as to the reason of many of the structural peculiarities of animals. It is, indeed, one of the reproaches that may be legitimately brought against our present methods of zoological study that we attach far too much importance to describing and recording minute differences between closely allied animals to the utter neglect of the study of their life-history. Whether the author will be successful in this mode of treatment we cannot at present even conjecture, for the two sections of the work now before us are devoted to a brief systematic survey of the leading groups of the animal kingdom, which must form a necessary introduction to its proper subject. These two sections may, indeed, be regarded as a kind of "index-museum" to the rest of the work. They are important as serving to show that from no point of view can systematic zoology be neglected, and also that the issue of a work like the present in no wise renders the older type of natural history superfluous. There is ample room for both, and neither poaches on the preserves of its fellow.

As a whole, the author's treatment of the systematic part of his subject may be regarded as fairly successful, and the volume before us is rendered highly attractive to the general reader by the beauty of its coloured plates and other illustrations. Where all are excellent it is difficult to select any for special commendation,

¹ "The Natural History of Animals; the Animal Life of the World in its various Aspects and Relations." By J. R. A. Davis. Half-vols. i. and ii. Pp. xxxii+429; illustrated. (London: Gresham Publishing Co., 1903.)

and we take as a sample, selected almost at random, the accompanying cut of Sahara foxes, or fennecs.

In regard to classification, so far as vertebrates at any rate are concerned, the author follows in the main some of the older schemes, especially in the case of birds, and in this, we think, he is well advised. We cannot, however, agree with him in making a special "order" for the lemurs, especially in view of the recent investigations of Dr. Forsyth Major and Prof. Elliot Smith. We are, moreover, somewhat surprised to find no mention of the okapi under the heading Giraffidæ, and the statement that the giraffe is the sole living representative of that family. Naturalists will be still more surprised to find the African *Anomalurus* classed as a member of the squirrel family, and no mention made of the fact that it has a relative unprovided with a flying-membrane. Again, it is quite

credited, we presume, to the printer's "devil." The want of an index is a serious drawback to a volume which in most respects is full of interest. R. L.

NOTES.

It is now more than a quarter of a century ago that the Duke of Devonshire's Royal Commission on Science, among its many important recommendations, few of which have been taken advantage of either by the then or subsequent Governments, urged the importance of the creation of a body of scientific advice which should bring all departments in close touch with the progress of science. We warmly congratulate Lord Curzon upon the steps he has recently taken to extend the many benefits of such a body to the Indian Empire. We reprint elsewhere the text of a resolution of the Indian Government which has recently appeared in the *Gazette*, and we may hope that in a few more decades the matter may be considered by the Government of Great Britain, in which certainly such a council is as much required as in India.

THE Prince Auguste D'Arenberg, Mr. Chamberlain, and Sir Archibald Geikie, F.R.S., have been elected honorary members of the Institution of Civil Engineers.

A LAHORE correspondent of the *Pioneer Mail* states that the Kanwar Sahib of Patiala has made a free gift of his house at Kasauli to the Pasteur Institute at that place, with the object of its being devoted to the purposes of that institution.

THE *Times* correspondent at Rome reports that the King and Queen of Italy were present on April 13 at the inaugural meeting of the International Congress of Agriculture. The congress, which is attended by representatives from many countries, will sit in Rome until April 18, when it will start on a tour of three weeks through Italy and Sicily.

REUTER reports that an eruption of the volcano Del Tierra Firme (Colombia), near Galera de Zamba, occurred on March 22 by which the village of Tiojo was destroyed. Brightly illuminated clouds, giving rise to the appearance of flames, were seen above the volcano on the night of March 24 by ships passing sixty miles off the coast.

SIR W. T. THISELTON-DYER, K.C.M.G., has sent us a copy of a letter from Mr. H. Powell, the curator of the Botanic Station at St. Vincent, to Dr. D. Morris, the Imperial Commissioner of Agriculture for the West Indies, as an official report upon the eruption of the Soufrière on March 22; he has also sent a cutting from the *Barbados Advocate* of March 28 describing some of the phenomena of the eruption. Mr. Powell reports that the clouds of stones, ashes, &c., were of stupendous size, and rose to enormous heights, similar to those of May 7, 1902. The noise on March 22 was, however, far less than on May 7, and the electric display was very little. At 11.30 a.m., and again at 12.30 p.m., on March 21 last, huge volumes of vapour were seen ascending from the crater, and at about 6.30 next morning the serious eruption commenced, and continued during the morning and most of the afternoon.



FIG. 1.—Sahara Foxes. (From "The Natural History of Animals.")

against modern usage to place the American mice and rats in the same genus (*Cricetus*) as the hamster. Neither is it correct to call the Indian elephant *Euelephas*, while the statement (p. 108) that the hippopotamus has only two upper incisors is inaccurate.

Although we by no means agree in many instances with the author's practice in regard to nomenclature, yet this is to so great an extent a matter of opinion that we forbear criticism. There can, however, be no excuse for describing the Indian rhinoceros in the text (p. 106) as *Rhinoceros unicornis*, and in the plate and its accompanying note as *R. indicus*, or for styling (p. 122) the llama *Lama lama* in the text and *Auchenia lama* in the plate and its explanation. *Lamaguanacus* for the guanaco, in place of *Lama guanacus*, must be